

Medical Laboratory Science

<http://med.und.edu/mls>

FACULTY: Coleman, Paur (Chair, Graduate Program Director), Lunak, Peterson, Porter, Ray, Schill, Solberg, and Triske

Degree Granted: Master of Science (M.S.)

The Department of Medical Laboratory Science offers a graduate program leading to the Master of Science degree in Medical Laboratory Science (MLS), non-thesis option. The course of study enhances the student's knowledge and skills in many areas of medical laboratory science. The curriculum is designed to prepare students for careers as administrative laboratory directors, clinical laboratory consultants, technical supervisors, laboratory educators, and/or leaders in the profession. The MS in MLS degree at UND is designed to accommodate working laboratory professionals, with online coursework and only two four-day on-campus residency requirements.

The MS in MLS curriculum requires a minimum of 33 graduate-level semester credits, with courses separated into three categories: Foundations Courses, Core Courses, and Elective Course. The 12 required credits of Foundations Courses focus on fundamentals of advanced-level practice in the field of MLS including technical concepts, communication skills, and project development.

Core Courses address the scientific content/theory related to the major testing areas in the medical laboratory. At least four Core Courses (12 credits) are required for degree completion, ensuring a rigorous and diverse course schedule that upholds the program's commitment to a generalist emphasis. Lastly, elective courses related to specialty areas—education, leadership, management, etc.—are available for students to customize their degree to fit individual needs. Common to all courses will be an emphasis on scholarly investigation, communication, and developing content expertise. The curriculum requires two separate four-day residency requirements as follows:

1. MLS 524 (Current Trends/Issues for the Lab Professional): Mon-Thu first full week in October
2. MLS 515 (Capstone in MLS): Tue-Fri the week of UND spring commencement in May

The courses are offered through online WEB based learning. Students participating in online coursework are required to have Internet access. Specific computer requirements are available from the MLS program. A limited number of teaching and research assistantships are available for students wishing to study on campus.

Details pertaining to admission requirements, degree requirements and courses offered can be found in the Degree section and at: med.und.edu/mls.

Master of Science (M.S.)

Mission Statement and Program Goals

The mission of the Master of Science Medical Laboratory Science (MS, MLS) program at the University of North Dakota is to generate and disseminate an advanced scholarly curriculum through distance and on-campus courses to baccalaureate degreeed, certified medical laboratory science professionals throughout the state, nation, and world. The curriculum is designed to prepare graduates for leadership roles in education, consulting, and healthcare administration.

Goal 1: Students will understand the role of the clinical laboratory in producing positive patient outcomes, and be able to communicate that role within a team of healthcare professionals.

Goal 2: Students will be prepared to identify, critically assess, and/or problem solve issues related to professional practice in the field.

Goal 3: Students will demonstrate knowledge of an advanced scholarly curriculum that encompasses the scope of practice in medical laboratory science.

Goal 4: Students will strengthen professional communication skills to be utilized across multiple topics or disciplines.

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Admission Requirements

Applicants who are seeking admission to School of Graduate Studies must meet all of the minimum general School of Graduate Studies admission requirements identified in the graduate catalog. In addition, prospective students must fulfill the following requirements for admission to the graduate program in Medical Laboratory Science. Application deadlines can be found on the MLS or UND School of Graduate Studies websites.

1. B.A. or B.S. degree and successful completion of the MLS (NCA), MT (ASCP) certification examinations (include proof of certification with School of Graduate Studies application).
2. Cumulative Grade Point Average (GPA) of at least 3.0 (on a 4.0 scale) for the junior and senior years of undergraduate work.
3. Satisfy the School of Graduate Studies' English Language Proficiency requirements as published in the graduate catalog.
4. At least two years of prior work experience in a medical laboratory is preferred (include a resume of applicable work experience with School of Graduate Studies application).

Degree Requirements

Students seeking the Master of Science degree at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Medical Lab Science Program.

1. A minimum of 33 semester credits as follows (see 'Curriculum' for course lists):
 - Foundation Courses = 12 Credits
 - Core Courses = 12 Credits
 - Elective Courses = 9 Credits
2. A cognate area of study or minor (minimum of 9 credits) is optional.
3. Successful completion of comprehensive examinations that takes place at the end of the student's program of study.

Curriculum

FOUNDATION COURSES

All Foundation Courses are required for degree completion. Each course is offered at least annually. MLS 524 has a 1-week on-campus residency requirement that must be completed during the first or second fall semester of coursework. MLS 515 also has a 1-week on-campus residency requirement that must be completed during the spring semester closest to degree completion.

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| MLS 501 | Advanced Laboratory Practice: Technical Concepts | 3 |
| MLS 515 | Capstone in Medical Laboratory Science | 2 |
| MLS 524 | Current Trends and Issues in Medical Laboratory Science | 2 |
| MLS 997 | Independent Study | 2 |
| MLS 525 | Professional Communication in the Medical Laboratory | 3 |

CORE COURSES

At least 12 credits of Core Courses (from a minimum of 4 separate courses) of the listed Core Courses are required for degree completion. Core Course credits beyond 12 can be counted as Elective credits. Core Courses are offered on a 3-year cycle.

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| MLS 502 | Advanced Clinical Hematology: Erythrocytes * | 3 |
| MLS 503 | Advanced Clinical Hematology: Leukocytes * | 3 |
| MLS 506 | Advanced Clinical Chemistry | 3 |

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| MLS 507 | Advanced Clinical Immunohematology | 3 |
| MLS 513 | Advanced Clinical Immunology | 3 |
| MLS 518 | Advanced Molecular Diagnostics | 3 |
| MLS 522 | Advanced Clinical Bacteriology | 3 |

* Only one of these courses can be counted as a Core Course (if both are taken, the second would be counted as an Elective)

ELECTIVE COURSES

At least 9 credits (from a minimum of 3 separate courses) of Elective courses are required for degree completion. Note that any Core Course taken beyond the required 12 credits can also be counted as an Elective course. Elective courses are offered on a 3-year cycle, with the exception of MLS 516 and MLS 591 which are available every fall and spring semester

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| MLS 505 | Advanced Laboratory Practice: Financial Management | 3 |
| MLS 508 | Leadership for the Laboratory Professional | 3 |
| MLS 509 | Medical Laboratory Education: Teaching Principles | 3 |
| MLS 516 | Special Topics in Medical Laboratory Science | 1-4 |
| MLS 517 | Advanced Laboratory Practice: Administrative Concepts | 3 |
| MLS 523 | Advanced Non-Bacterial Microbiology | 3 |
| MLS 526 | Advanced Clinical Hemostasis | 3 |
| MLS 527 | Medical Laboratory Education: Assessment and Accreditation | 3 |
| MLS 591 | Directed Study in Laboratory Medicine | 1-6 |

Courses

MLS 501. Advanced Laboratory Practice: Technical Concepts. 3 Credits.

An examination of technical concepts and skills utilized to ensure quality in the medical laboratory. The course will focus on enhancing quality control analysis and method validation skills, and utilizing statistical tools to monitor and improve quality testing processes in the medical laboratory. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only.

MLS 502. Advanced Clinical Hematology: Erythrocytes. 3 Credits.

A comprehensive study of human erythrocytes. Included are discussions of normal erythrocyte structure, function, production, regulation, and the pathophysiology of related disorders. The role of current laboratory testing in the diagnosis of erythrocyte disorders will be emphasized. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only. F,S.

MLS 503. Advanced Clinical Hematology: Leukocytes. 3 Credits.

A comprehensive study of human leukocytes. Included are discussions of normal leukocyte structure, function, production, regulation, and the pathophysiology of related disorders. The role of current laboratory testing in the diagnosis of leukocyte disorders will be emphasized. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only. F,S.

MLS 505. Advanced Laboratory Practice: Financial Management. 3 Credits.

This course presents an overview of financial management for medical laboratories. Students examine several basic financial operation concepts, including how to evaluate productivity, manage salaries, and manage supply inventories for maximum cost containment. Students learn how to plan for capital expenditures, set laboratory fee rates, and create, implement, and evaluate a budget. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only. F,S.

MLS 506. Advanced Clinical Chemistry. 3 Credits.

An advanced study of the theories and principles of clinical chemistry. Correlation of laboratory results with associated disease pathophysiology will be emphasized. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only. F,S.

MLS 507. Advanced Clinical Immunohematology. 3 Credits.

A detailed study of human blood groups including laboratory aspects of blood banking with special reference to theoretical and clinical applications. Emphasis will be placed on antibody identification and advanced problem solving techniques. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only. F,S.

MLS 508. Leadership for the Laboratory Professional. 3 Credits.

This course will focus on developing leadership skills applicable to the medical laboratory profession. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only. F,S.

MLS 509. Medical Laboratory Education: Teaching Principles. 3 Credits.

Approaches to teaching in Medical Laboratory Science will be examined, with an emphasis on development of instructional and evaluative materials. Additional topics discussed will include learner diversity, classroom management techniques, and course assessment. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisite: MLS program students only. F,S.

MLS 513. Advanced Clinical Immunology. 3 Credits.

An in-depth investigation of immune system functions. Correlation of laboratory results with normal and disease states will be emphasized. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. Prerequisites: Restricted to MS in MLS program students only. F,S.

MLS 515. Capstone in Medical Laboratory Science. 2 Credits.

This course is a summative experience that occurs in a face-to-face environment at the end of the degree process. Graduate-level Medical Laboratory Science students reflect upon and consider applications of degree coursework. Additionally, the future of the medical laboratory science profession will be discussed and career opportunities will be explored. Prerequisites: Completion of at least 20 credits in the MLS Master of Science Program; MLS program students only. S.

MLS 516. Special Topics in Medical Laboratory Science. 1-4 Credits.

Topical courses in laboratory medicine organized on a semester by semester basis. Prerequisite: MLS program students only. Repeatable to 12 credits. F,S.

MLS 517. Advanced Laboratory Practice: Administrative Concepts. 3 Credits.

An examination of administrative concepts and skills utilized to ensure quality in the medical laboratory. The course will focus on advanced concepts related to medical laboratory accreditation, inspection, and federal regulations. An emphasis will be placed on the utilization of best practices to monitor and improve laboratory diagnostics. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. F,S.

MLS 518. Advanced Molecular Diagnostics. 3 Credits.

An analysis of specific molecular biology application in the medical laboratory including correlation of cell biology, DNA chemistry, genetics, and laboratory techniques in relation to diagnostic investigations. Course offered in Fall or Spring Semester on a 3-year cycle. F,S.

MLS 522. Advanced Clinical Bacteriology. 3 Credits.

An advanced study of the laboratory diagnosis of bacterial diseases and an in depth exploration of antibacterial agents. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. F,S.

MLS 523. Advanced Non-Bacterial Microbiology. 3 Credits.

An advanced study of the laboratory diagnosis of viral, fungal, and parasitic diseases and associated antimicrobial agents. F,S.

MLS 524. Current Trends and Issues in Medical Laboratory Science. 2 Credits.

This course is an introductory experience that occurs in a face-to-face environment at the beginning of the degree process. Through group discussion and presentations, Medical Laboratory Science graduate students will explore current trends and issues related to all aspects of the profession. F.

MLS 525. Professional Communication in the Medical Laboratory. 3 Credits.

This course will focus on developing written and oral communication skills as a foundation for application within the medical laboratory profession. Students will learn how to identify, assess, and incorporate appropriate reference materials to prepare professional, scholarly papers and presentations. Prerequisite: Must be satisfactorily completed in the first or second semester of degree coursework. F,S.

MLS 526. Advanced Clinical Hemostasis. 3 Credits.

A comprehensive study of the human hemostatic system. Normal function, disease pathophysiology, and the evolution of hemostasis in healthcare will be discussed. The laboratory's role in the diagnosis and/or monitoring of bleeding and clotting disorders will be emphasized. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. F,S.

MLS 527. Medical Laboratory Education: Assessment and Accreditation. 3 Credits.

This course will focus on assessment and accreditation specific to medical laboratory education programs. Topics will include examination of assessment at the classroom, program, and institutional levels, including how to create and implement an assessment plan. Medical laboratory education accreditation processes will also be examined, with an emphasis on the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) standards. Offered once per 3-year cycle (fall or spring semester). See program website for current course rotation. F,S.

MLS 591. Directed Study in Laboratory Medicine. 1-6 Credits.

Designed to meet the needs of individual student-focused studies in laboratory medicine. Prerequisite: Restricted to Master of Medical Lab Science students. Repeatable to 6 credits. On demand.

MLS 996. Continuing Enrollment. 1-12 Credits.

Prerequisite: MLS program students only. Repeatable. S/U grading.

MLS 997. Independent Study. 2 Credits.

The independent study is a culminating experience for Medical Laboratory Science graduate students. Utilizing skills and information acquired throughout the degree process, students will select, investigate, and present findings of a topic with significance to the major field of study. Prerequisite: MLS program students only. F,S.